Development of High Performance Hybrid Fuels

Completed Technology Project (2011 - 2015)

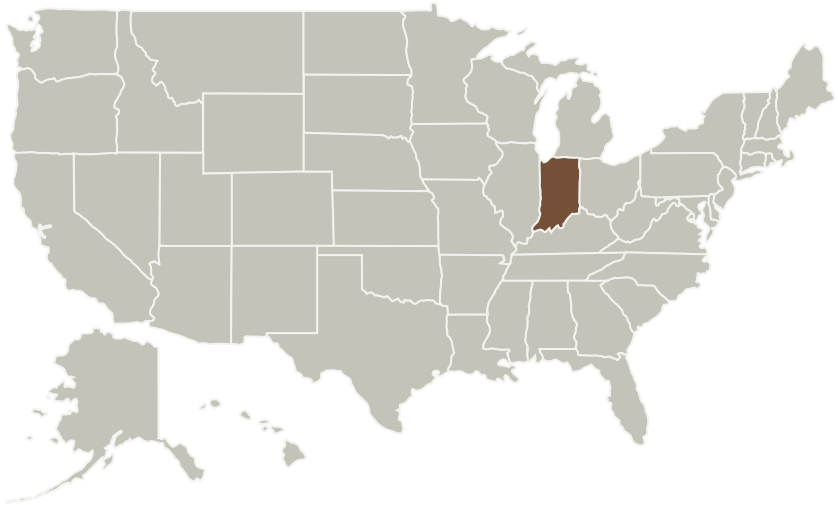
Project Introduction

NASA's strategic goals call for innovation in space technology for our nation's explorative future. Early phase paraffin fuel technology could enable practical hybrid motor use by producing high regression rates. Further, the creation of a robust and novel fuel, that overcomes paraffin mechanical property drawbacks, would produce high payoffs. The proposed research specifically will investigate polymer addition to paraffin grains, study the particle entrainment theory, evaluate hydride and metal additives, and demonstrate hypergolic ignition. We hope to find that polymers strengthen the low mechanical properties of paraffin. We will design, build, and demonstrate an experiment in which particle entrainment can be seen and understood. We will evaluate additives to increase performance and facilitate reliable and hypergolic ignition. Outreach to student run clubs and undergraduate engineers will also play an integral role demonstrating the promise of paraffin propellants through sounding rockets. A high performance paraffin based grain is a game-changing technology that could lead to the economical use of hybrid rockets.

Anticipated Benefits

A high performance paraffin based grain is a game-changing technology that could lead to the economical use of hybrid rockets.

Primary U.S. Work Locations and Key Partners



Project Image Development of High Performance Hybrid Fuels

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Responsible Program:

Space Technology Research Grants

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Organizations Performing Work	Role	Type	Location
Purdue University-Main Campus	Supporting Organization	Academia	West Lafayette, Indiana

Primary U.S. Work Locations
Indiana

Images

4309-1363178639353.jpg
Project Image Development of High Performance Hybrid Fuels
(https://techport.nasa.gov/image/1750)

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Project Management

Program Director:
Claudia M Meyer

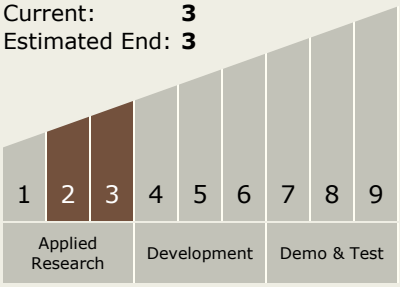
Program Manager:
Hung D Nguyen

Principal Investigator:
Steven Son

Co-Investigators:
Christopher R Zaseck
Chris Zaseck

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.5 Hybrids